the blend barrier layer and the second surface is in contact with the second LDPE layer.

REMARKS

1. Claim Rejection 35 U.S.C. 112

Claims 19-35 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The amended claims recite that the blend layer has an oxygen transmission rate (OTR) of less than about 1 cc·mil/100 in^2 · day.

The ori ginal patent application includes Examples on pages 14-18 that contain OTR data in units of cc/m^2/atm/day (A). The examiner states that it is unclear how to convert these values into units of cc*mil/100 in^2*day (B). The conversion from A to B is made 1) by multiplying A by the thickness of the barrier being tested in units of mils, and 2) converting from m^2 to 100 in^2 (multiply A by 0.0645). Conversion of all the data is shown below. In the Rejection, the examiner states that much of the data did not appear to fall within our claimed range (as mentioned in Claim 19 of our amended Claims). After the correct conversion is made, all barrier data, measured at 0 % RH for blends within the claimed composition range (5-55% PE) fall within our claimed OTR range (less than 1 cc*mil/100 in^2*day).

a) Example 1

40% LDPE/2% tie/16% blend/2% tie/40% LDPE (barrier layer is only 16% of total thickness, use 16% of "total film thickness" for the conversion)

1) First table in Example 1 – 44 mole % ethylene EVOH (shaded region = claimed compositions)

% EVOH in blend	OTR (cc/m^2/atm/day)	Total film thickness (mil)	Conversion	OTR (cc*mil/100 in^2*day)
20	Too high to meas	1.5	*1.5*0.16*0.0645	--
25	Too high to meas	1.5	*1.5*0.16*0.0645	--
30	507 +/- 20	1.5	*1.5*0.16*0.0645	7.8 +/- 0.3

35	52 +/- 30	1.5	*1.5*0.16*0.0645	0.80 +/- 0.46
40	28 +/- 10	1.5	*1.5*0.16*0.0645	0.43 +/- 0.15
45	25 +/- 2	1.5	*1.5*0.16*0.0645	0.39 +/- 0.03
50	18 +/- 0.3	1.5	*1.5*0.16*0.0645	0.28 +/- 0.00
60	19 +/- 2	1.4	*1.4*0.16*0.0645	0.27 +/- 0.03
70	15 +/- 0.3	1.3	*1.3*0.16*0.0645	0.20 +/- 0.00
100	10 +/- 0.3	1.3	*1.3*0.16*0.0645	0.13 +/- 0.00

2) Second table in Example 1 – 29 mole % ethylene EVOH (shaded region = claimed compositions)

% EVOH in blend	OTR ($cc/m^2/atm/day$)	Total film thickness (mil)	Conversion	OTR ($cc*mil/100\ in^2*day$)
20	590 +/- 20	8	*8*0.16*0.0645	48.7 +/- 1.7
25	580 +/- 30	8	*8*0.16*0.0645	47.9 +/- 2.5
30	520 +/- 5	8	*8*0.16*0.0645	43.0 +/- 0.4
35	1.2 +/- 0	8	*8*0.16*0.0645	0.099 +/- 0.000
40	0.80 +/- 0.3	8	*8*0.16*0.0645	0.069 +/- 0.026
50	0.27 +/- 0.05	8	*8*0.16*0.0645	0.022 +/- 0.004
70	0.069 +/- 0.005	8	*8*0.16*0.0645	0.006 +/- 0.000
25	Too high to meas	1.5	*1.5*0.16*0.0645	--
30	Too high to meas	1.5	*1.5*0.16*0.0645	--
35	9.7 +/- 0.3	1.5	*1.5*0.16*0.0645	0.15 +/- 0.00
40	3.4 +/- 0.8	1.5	*1.5*0.16*0.0645	0.053 +/- 0.012
50	1.2 +/- 0	1.4	*1.4*0.16*0.0645	0.017 +/- 0
70	0.58 +/- 0	1.3	*1.3*0.16*0.0645	0.078 +/- 0
100	0.63 +/- 0.03	1.3	*1.3*0.16*0.0645	0.0085 +/- 0.00040

Example 2

For these data, the thicknesses were reported for the blend layer alone. This number was used directly in the conversion without the 0.16 correction factor used above. The barrier numbers are higher than the claimed range because the blends were not produced on an extrusion coating line. They were produced on a small lab line that runs at much lower speeds. The extruded layer was not coated onto paperboard and pulled at a fast line speed. As a result, the blend layer is not oriented the same way as the other Examples. The point of this data is not to show the absolute value of OTR, but to show the comparison between 100 % EVOH and the claimed resin compositions. The barrier of the claimed compositions does not increase as rapidly with higher humidity as the 100 % EVOH layer.

% EVOH in blend/%RH	OTR (cc/m^2/atm/day)	Blend layer thickness (mil)	Conversion	OTR (cc*mil/100 in^2*day)
50/0	49.5 +/- 2.7	4.4	*4.4*0.0645	14.0 +/- 0.77
60/0	40.7 +/- 18.1	5.1	*5.1*0.0645	13.4 +/- 6.0
70/0	29.1 +/- 7.7	5.1	*5.1*0.0645	9.57 +/- 2.53
100/0	15.2 +/- 0.4	4.6	*4.6*0.0645	4.51 +/- 0.12
50/75	37.3 +/- 0.3	4.4	*4.4*0.0645	10.6 +/- 0.1
60/75	19.3 +/- 13.3	5.1	*5.1*0.0645	6.35 +/- 4.38
70/75	41.0 +/- 10.3	5.1	*5.1*0.0645	13.5 +/- 3.4
100/75	23.0 +/- 0.1	4.6	*4.6*0.0645	6.82 +/- 0.03

Example 3

These data were reported in terms of cc*cm/m²/atm/day. To convert to the same units as above, multiply by 39.4 mil/cm (to convert from cm to mil) then multiply by 0.0645 to convert from m² to 100 in². (shaded region = claimed compositions at 0 % RH)

Sample/% RH	OTR (cc*cm/m²/atm/day)	Conversion	OTR (cc*mil/100 in²*day)
Cast film, pin mix screw, 250 C/0 % RH	0.018 +/- 0.001	*39.4*0.0645	0.0457 +/- 0.0025
Cast film, 3/1 screw, 250 C/0% RH	0.019 +/- 0.001	*39.4 *0.0645	0.0483 +/- 0.0025
Cast film, 3/1 screw, 280 C/0 % RH	0.022 +/- 0.001	*39.4 *0.0645	0.0559 +/- 0.0025
5-layer coex/0% RH	0.022 +/- 0.001	*39.4 *0.0645	0.0559 +/- 0.0025
Cast film, pin mix screw, 250 C/75 % RH	0.046 +/- 0.001	*39.4 *0.0645	0.117 +/- 0.003
Cast film, 3/1 screw, 250 C/75 % RH	0.048 +/- 0.001	*39.4 *0.0645	0.122 +/- 0.003
Cast film, 3/1 screw, 280 C/75 % RH	0.064 +/- 0.001	*39.4 *0.0645	0.163 +/- 0.005
5-layer coex/75 % RH	0.016 +/- 0.001	*39.4 *0.0645	0.0407 +/- 0.0000

b) Example 4

The Example describes a multilayer film including a 3 lb/3000 ft² barrier layer. Based on density of the resins (1.2 for both grades of EVOH and 1.1 for the 50/50 blend of EVOH and LDPE) and the coat weight of 3 lb/ream, this corresponds to 0.2 mils for all three materials. To convert to the desired units, multiply by 0.2 mils and 0.0645 (the area units conversion).

Barrier Material	OTR	Con	OTR (cc*mil/100

PAGE 14/17 * RCVD AT 7/15/2005 2:36:47 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-1/1 * DNIS:8729306 * CSID:513 248 6455 * DURATION (mm-ss):11-06

	(cc/m²/atm/day)	version	in²*day)
EVOH (29 mole % ethylene)	148.6 +/- 0.4	*0.2*0.0645	1.917 +/- 0.005
EVOH (29 mole % ethylene)	157.4 +/- 3.4	*0.2 *0.0645	2.030 +/- 0.044
50/50 (44 mole % EVOH/LDPE)	291.4 +/- 21.7	*0.2 *0.0645	3.759 +/- 0.280

c) Example 5

The Example describes a multilayer film including a 3 lb/3000 ft² barrier layer. Based on density of the resins (1.2 for EVOH; 0.92 for LDPE and LLDPE; 0.90 for PP → 1.1 for 50/50 blends of EVOH with LDPE, LLDPE, or PP) and the coat weight of 3 lb/ream, this corresponds to 0.2 mils for all three blends. To convert to the desired units, multiply by the thickness (mils) and 0.0645 (the area units conversion).

Barrier Material	OTR (cc/m²/atm/day)	Conversion	OTR (cc*mil/100 in²*day)
50/50 EVOH/PP	23.0 +/- 2.2	*0.2*0.0645	0.297 +/- 0.028
50/50 EVOH/LLDPE	16.7 +/- 1.3	*0.2*0.0645	0.215 +/- 0.017
50/50 EVOH/LDPE	21.2 +/- 2.6	*0.2*0.0645	0.273 +/- 0.034

In addition to the OTR units, the patent examiner's other issue under this rejection was that the Examples do not cover more than one grade of EVOH or polyolefin. Example 1 discloses two grades of EVOH: 44 and 29 mole % ethylene. While it is true that Example 1 does not cover more than one grade of polyolefin, Example 5 includes polypropylene (PP) and linear low density polyethylene (LLDPE). The data for these two grades of polyolefins is more limited in scope than the data presented for LDPE in Example 1, but the patent application does show it is possible to include these materials in the invention. During a telephone interview on 4/27/05 with Examiner Bissett it was agreed to limit the term "polyolefin" to "polyethylene" based on the belief that support for other polyolefins was not present, however this

was a mistake. Therefore the claims are amended to include polypropylene and linear low density polyethylene as disclosed in Example 5.

Claims 19-23 and 26-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huffman et al. in view of Pearson et al. (WO 96/10053).

This rejection is based on the Pearson patent. This patent covers the LDPE/EVOH blend with an LDPE concentration between 60 and 90 %. Pearson states that a compatibilizer may be used. Despite the claim as low as 60 %LDPE, the Examples only include data for 80-90 % LDPE. Pearson does not describe the unexpected occurrence at a composition of about 65 % LDPE where the blend characteristics dramatically change from LDPE-like (poor barrier, poor heat sealability, no tie layer required when coextruded with LDPE) to EVOH-like (good barrier, poor heat sealability, tie layer required when coextruded with LDPE). This change occurs within the composition range claimed by Pearson, but it is not mentioned. It is this dramatic change that is the inventive aspect of our invention. Without this occurrence at 65 % LDPE, there is nothing unexpected. Based on information in the Pearson patent, Applicant's OTR values obtained at 40% EVOH are MUCH better than expected when compared to Pearson.

Furthermore, Applicant limited the Claims to 5-55 % LDPE from the original Claim of 5-65 % LDPE (expressed as 35 – 95 % EVOH). This takes the claimed invention out of the range claimed by Pearson. This amendment and above reasoning cures the rejections raised in paragraphs 4-9 and 12.

Claims 19-22 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huffman et al. in view of the combined teachings of Svensson (EP 423511 A1) and Harita et al.

The Svensson patent discloses EVOH/PE blends with 20-80 % PE, 50-80 % PE, and 60 % PE. In both major embodiments of the patent, this blend layer is used as the heat seal layer. Applicants have shown that structures with LDPE as the sealant layer form good heat seals at relatively low temperatures (240-250 F) By contrast sealant layers composed of 50 and 60 % LDPE blends showed close to 100 % fiber tear only when the sealing temperature is increased to near 300 F. In the packaging industry, materials with minimum heat seal temperatures around 300 F are regarded as poor sealant layers. While it is possible to form a seal, the temperature requirements are too high to permit the converting line to run at sufficient line speeds to be competitive. The 240-250 F range observed for the LDPE sealant layers is commonly regarded as an acceptable range for heat sealability. These results indicate that a blend with EVOH as the continuous phase (LDPE < ~65 %) is not an acceptable heat sealable layer. Svensson discloses that with this heat seal layer, the structure could be "reformed into packages with mechanically strong and durable seal joints using conventional heat sealing technology during the production of the package," however this is not true.

The present invention is not intended to be a heat seal layer. The invention covers the composition at which the blend possesses an unexpectedly good oxygen barrier (5-65 % polyolefin).

The amendmented claims and above arguments address all rejection made by the Examine and place the claims in a condition for allowance.

Respectfully submitted,

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